

University of Groningen

Do high functioning autistic individuals treated in a residential setting differ in divided attention abilities from those treated in an out-patient setting?

Bogte, Hans; Flamma, Bert; Van der Meere, Jaap

Published in:
International Journal of Circumpolar Health

DOI:
[10.3402/ijch.v61i0.17499](https://doi.org/10.3402/ijch.v61i0.17499)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2002

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Bogte, H., Flamma, B., & Van der Meere, J. (2002). Do high functioning autistic individuals treated in a residential setting differ in divided attention abilities from those treated in an out-patient setting? *International Journal of Circumpolar Health*, 61(sup 2), 15 - 21. <https://doi.org/10.3402/ijch.v61i0.17499>

Copyright

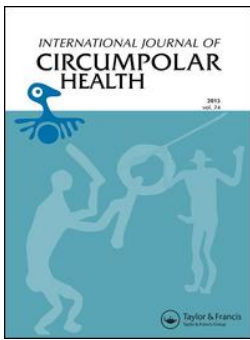
Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.



Do high functioning autistic individuals treated in a residential setting differ in divided attention abilities from those treated in an out-patient setting?

Hans Bogte, Bert Flamma & Jaap Van der Meere

To cite this article: Hans Bogte, Bert Flamma & Jaap Van der Meere (2002) Do high functioning autistic individuals treated in a residential setting differ in divided attention abilities from those treated in an out-patient setting?, International Journal of Circumpolar Health, 61:sup2, 15-21

To link to this article: <https://doi.org/10.3402/ijch.v61i0.17499>



© 2002 The Author(s). Published by Taylor & Francis.



Published online: 01 Sep 2002.



Submit your article to this journal [↗](#)



Article views: 11



View related articles [↗](#)

DO HIGH FUNCTIONING AUTISTIC INDIVIDUALS TREATED IN A RESIDENTIAL SETTING DIFFER IN DIVIDED ATTENTION ABILITIES FROM THOSE TREATED IN AN OUT-PATIENT SETTING?

ABSTRACT

The goal of this current study was to test divided attention abilities of a group adults with autism and normal intellectual functioning, treated in a residential setting versus those treated in an out-patient setting. Both groups were compared with a control group using the Sternberg (1969) reaction time paradigm. It appeared that the in-patient group suffered from a divided attention deficit compared to a norm group. The patients treated in an out-patient setting scored in between the norm group and the in-patient group. Findings are discussed with respect to the relevance for the day to day clinical practice.

Keywords:

High Functioning Autism, Divided Attention, Reaction Times

*Hans Bogte¹,
Bert Flamma¹,
Jaap van der Meere²*

¹ Workhome Zuidlaren,
Stichting GGz Groningen,
The Netherlands

² Laboratory of Experimental
Clinical Psychology,
Grote Kruisstraat 2-1,
9712 TS Groningen, The Netherlands

Autism and related disorders (Pervasive Developmental Disorders or 'PDD') are characterised by severe impairments in social interaction skills and in communication, and by peculiar patterns of behaviour, interest and activities (1). The behavioral manifestations vary with age and ability, but the core features are principally the same (e.g. 2). Autism might be due to abnormalities in processing information in a non-social domain, despite the fact that a core symptom in autism is social abnormality (3,4). Three domains of cognitive dysfunction in autism have been proposed: (a) theory of mind, (b) central coherence, and (c) executive function (5). Executive function is the postulated mechanism that enables the normal person to shift attention, inhibit pre-potent response, generate goal-directed behaviour, and solve problems in a planned, strategic way (6). Within this perspective the aim of the current study is to investigate the divided attention abilities of a normally intelligent group of adults with Autistic Disorder. In every day life the ability to divide one's attention means the capacity to pay attention to several important cues at the same time. In clinical practice it is evident that autistic persons find it hard to do more than one thing at the time, and to understand and carry out complex instructions, irrespective of their IQ level. Many patients give the impression to experience life in general as very chaotic, and not only so because they fail to understand intentions.

One way to objectify this postulated divided attention deficit in the laboratory condition is the Sternberg reaction time paradigm (7). Here two sets of items, a memory set and a display set, are presented sequentially on a monitor. A yes response is required when one of the items of the memory set matches one of the items of the display set, otherwise a no response is required. Responses are made by pressing a right or left response button. The number of items in the memory and display set are, respectively, one and four items in the easy condition, and two and four items in the difficult condition. Cognitive load is defined as the number of items that are to be remembered ('memory set') multiplied with the number of items that have to be judged ('display set'). According to the model a divided attention deficit is defined in terms of slow and erroneous performance as function of cognitive load.

The Sternberg paradigm or variations of this task have been used in the field of autism. Ciesielski et al. (8) reported that autistic individuals had longer reaction times and identified fewer correct targets

in a cross-modal visual-auditory divided-attention task than did normal controls. In another study it was found, that autistic subjects fail to detect rare auditory targets significantly more than normal subjects did, and that they were unable to efficiently divide their attention in a cross-modal task (9). Divided attention problems are also reported in children with autism or related disorders: PDD-NOS (10,11).

In view of the purpose of our study we predict that if in-patients are more severely handicapped than out-patients and/or the norm group, than the effect of cognitive load on their reaction time performance will be more pronounced.

METHOD

Group

Fourteen adults with Autistic Disorder (1) were tested. Seven of them (six males) living in an in-patient setting, a so-called 'workhome'. The other seven (six males) were out-patients. All individuals were diagnosed according to DSM-IV criteria (1) by an experienced child- and adolescent psychiatrist (first author). There were no somatic disorders in the autistic sample that might influence performance on the reaction time test. Five individuals of the in-patient group had a verbal intelligence slightly below the normal range, but all subjects were on average of normal intelligence. In the in-patient group all but one used psycho-active medication, to prevent temper tantrums, mood disorders or epileptic seizures (neuroleptics, anti-depressants, lithium and anti-epileptic medication). Two of the individuals of the out-patient group were on medication. All subjects were above 21 years of age. The control group consisted of seven individuals (three males) matched for educational level.

Task and instruction

The subject is placed in an easy chair in front of a monitor. The monitor is situated at a distance of 1 meter from the subject. Consonants are displayed on the monitor. The consonants (stimuli) are constructed from an appropriate matrix of 0.6x1.0 cm., and are presented at the corners of a 5x5 cm² central in the screen of the monitor. Stimuli and timing are controlled by a personal computer. The subject is instructed to respond as quickly and accurately as possible. The 'yes'-response has to be given by pressing a key with the index

finger of the dominant hand. The 'no'-response has to be given by pressing a key with the index finger of the other hand. Fifty percent of the trials requires 'yes'-responses. Preceding each test the subject will do a number of practice trials (a sample of 15% of the trials of the complete task; ore more than 15% if necessary).The task consists of two sets of 64 trials each. The order was randomized.

STATISTICAL METHODS

The design was a repeated measurement design with group (three levels) as the between subject factor. Load (two levels) and response type (two levels) were the within subject factors. Mean reaction time, standard deviation of reaction time, and errors (false alarms and misses) were the dependent variables.

RESULTS

As figure 1 shows, the in-patient group was the slowest of the three groups, followed by the out-patient group and the norm group. This finding was statistically confined by a group main effect $(2,18) = 7.1$, $p < .005$. As predicted by the model the mean reaction times increased as function of the cognitive load. The load main effect was $(1,18) = 115.1$, $p < .000$, and may be considered as an index of divided attention ability. Groups were different with respect to this index: the two way interaction group by load was $(2,18) = 3.3$, $p < .06$ indicating a divided attention deficit in the in-patient group. As can be seen from figure 1 especially the no responses were delayed in the in-patient group. The group by response type interaction was $(2,18) = 4.2$, $p < .03$, and the three way interaction group by load by response type interaction was $(2,18) = 3.5$, $p < 0.05$. No group differences were found with respect to standard deviations of RT.

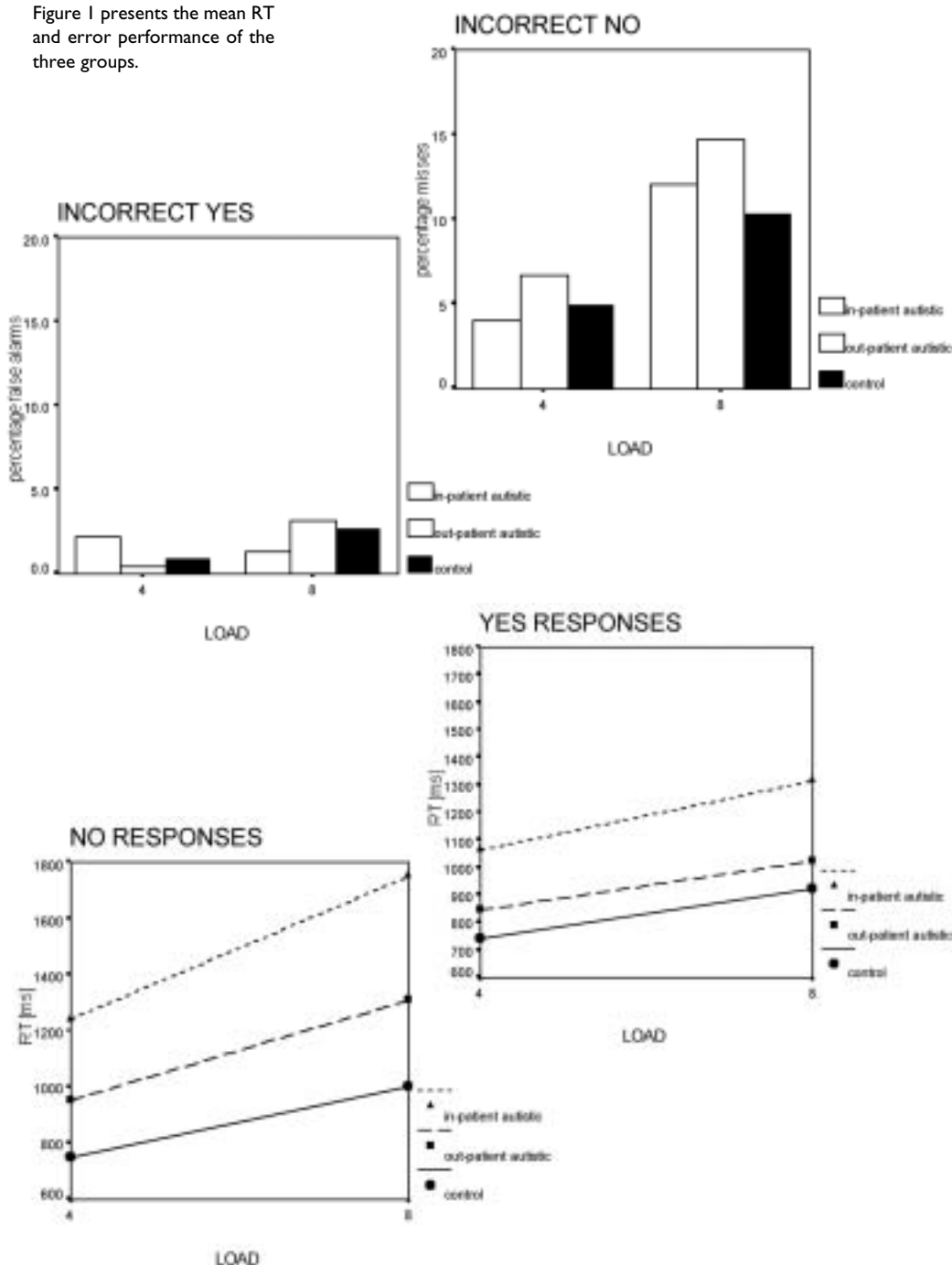
A series of contrast analyses (norm group versus in-patient group, norm group versus out-patient group, in-patient versus out-patient group) yielded no differences in divided attention abilities between the out-patient group and the norm group.

With respect to errors no differences between groups were found.

DISCUSSION

The aim of the study was to examine whether high functioning autistic individuals treated in an in-patient setting differ from autistic individuals in an out-patient setting concerning divided attention

Figure 1 presents the mean RT and error performance of the three groups.



abilities. For this purpose the reaction time paradigm of Sternberg (7) was carried out in an in- and out- patient group and compared with a norm group. It appeared that the reaction times of the in-patient group were about two times as slow as the norm group in the difficult cognitive condition, which is indicative for a divided attention problem.

The choice for normally intelligent adults as subjects for the study has a twofold reason. Mental retardation should be considered to be a bias, because (a) instruction to the test will be harder to understand for retarded people than for normally intelligent people, and (b) mental retardation by itself may influence the results of the tested person. And to avoid bias caused by differences in cognitive development, we chose to test adults rather than children.

Our results show, that the in-patient group was handicapped in terms of having a divided attention deficiency. The out-patient group did not differ significantly in this respect from a norm group. The small sample size may have caused this negative finding.

It should be noted that in the in-patient group all except one used psycho-active medication whereas in the out-patient group only two individuals used such medication. Consequently it remains to be seen if the difference in performance is partly or entirely due to a more severe manifestation of the Autistic Disorder, or that it is more or less an effect of the medication. Having this said the in-patient group was tested while the individuals were at a therapeutic optimum. It is obvious that further testing is needed to resolve the issue, if the divided attention ability of an autistic individual is a decisive factor in his or her capacity to live independently or not. Nonetheless, for clinical practice the question to what extent the medication issue confounds the findings with respect to divided attention is less relevant. Workers in an in-patient setting of this kind should be aware of this difficulty in their patients when assisting and instructing these autistic individuals. Clinicians simply have to work with individuals who suffer of a divided attention deficiency, whether or not this is the side-effect of medication.

REFERENCES

1. APA (American Psychiatric Association): DSM-IV, Diagnostic and Statistical Manual of Mental Disorders, 4th edition. Washington DC: APA 1994.
2. Frith U. Asperger and his syndrome. In Frith U. (ed), Autism and Asperger syndrome. Cambridge: Cambridge University Press 1991.
3. Jolliffe T, Baron-Cohen S. Are people with autism and Asperger Syndrome faster than normal on the Embedded Figures Test? J Child Psychol Psychiatry 1997; 38:5: 527-534.
4. Rutter M, Bailey A. Thinking and relationships: mind and brain (some reflections on theory of mind and autism). In S. Baron-Cohen, H. Tager-Flusberg & D.J. Cohen (Eds.), Understanding other minds. Oxford, New York, Tokyo: Oxford University Press 1993.
5. Baron-Cohen S, Swettenham J. Theory of Mind in autism: Its relationship to Executive Function and Central Coherence. In D.J. Cohen & F.R. Volkmar (Eds.), Handbook of autism and pervasive developmental disorders. New York: Wiley & Sons 1997; 880-893.
6. Goldman-Rakic PS. Working memory and the mind. In Mind and brain. Readings from Scientific American. New York: Freeman Press 1993.
7. Sternberg S. Discovery of processing stages: Extensions of Donder's method. Acta Psychol 1969; 8: 276-315.
8. Ciesielski KT, Knight JE, Prince RJ, Harris RJ, Handmaker SD. Event related potentials in cross-modal divided attention in autism. Neuropsychologia 1995; 33, 225-246.
9. Casey BJ, Gordon CT, Mannheim GB, Rumsey JM. Dysfunctional attention in autistic savants. J Clin Exp Neuropsychol 1993; 15: 933-46.
10. Althaus M, De Sonnevile LMJ, Minderaa RB, Hensen LGN, Til RB. Information processing and aspects of visual attention in children with the diagnosis 'Pervasive Developmental Disorder Not Otherwise Specified' (PDDNOS): I. Focused and divided attention. Neuropsychology 1996; 2: 17-21.
11. Swaab-Barneveld J.T. Information Processing in a Child Psychiatric Population. Utrecht. Thesis. 1998.

*Hans Bogte
Stichting GGz
Groningen locatie Zuidlaren
P.O. Box 128
9470 AC Zuidlaren
The Netherlands*